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A Projection X-Ray Microscope Based on Highly Charged Ions R.E. MARRS, D. SCHNEIDER, A.V. BARNES, B. BECK, J. STEIGER, Lawrence Livermore National Laboratory Slow highly-charged ions focused to a small spot on a target provide a "point" source of x rays as they recombine at the target surface. We are developing this novel x-ray source for microscopy and microanalysis. Highly charged ions, such as Xe^{44+}, are obtained from an electron beam ion trap (EBIT) at LLNL. The measured temperature and volume of the trapped ions suggests that they can be extracted and focused to spots of 1 micron size from which the emission rate of 4.5-keV Xe L x rays is expected to be 10^5 sec^{-1} sr^{-1}. The x-ray energy can be varied by changing the incident ion species. Appropriate ion focusing optics are being constructed. X-ray images will be obtained by point projection onto a CCD camera; the resolution is determined by the size of the focused ion spot. Scanning microscopy is also possible if the sample is placed very close to the x-ray emitting spot. This work was performed under the auspices of the U. S. Department of Energy by the Lawrence Livermore National Laboratory under contract W-7405-ENG-48.